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Question Paper Code : 60758

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2016.

Third Semester

Information Technology

IT 2202/IT 36/10144 IT 305/080250004 —PRINCIPLES OF COMMUNICATION

(Regulations 2008/2010)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Define modulation.
2. Find the bandwidth of an AM (DSBFC) wave for a carrier frequency $f_c = 100$ KHz and maximum modulation signal frequency $f_m = 5$ KHz.
3. Differentiate coherent and noncoherent binary modulation techniques.
4. Represent QAM signals in the signal space and find the distance between signal vectors.
5. State the usage of linear predictive coder in communication system.
6. What is the use of eye diagram?
7. What is meant by slow frequency hopping?
8. Define processing gain.
9. What is GEO synchronous satellite? And write its importance.
10. Write the type of optical fibers used in communication.

PART B — (5 × 16 = 80 marks)

11. (a) (i) How an AM wave is demodulated using envelope detector? Derive the expression for RC time constant and also state the necessity of choosing correct value of RC time constant and brief the limitation. (10)
- (ii) A radio telephone transmitter using AM has unmodulated carrier output of 20kw and can be modulated to a maximum depth of 80% with a sinusoidal modulating voltage without causing overloading. Find the value to which unmodulated carrier power may be increased without resulting in overloading if the maximum permitted modulation index is restricted to 60%. (6)

Or

- (b) (i) Brief the relation between FM and PM. (3)
- (ii) Explain the generation of FM using Armstrong method. (8)
- (iii) When the modulating frequency in a FM system is 400 Hz, modulating voltage is 2.4 V and the modulation index is 60. Calculate the maximum frequency deviation. What is the modulation index when the modulation frequency is reduced to 250 Hz and the modulating voltage is raised to 3.2 V? (5)
12. (a) (i) With block diagram explain the two different methods of carrier recovery in detail. (12)
- (ii) For a QPSK modulator with an input data rate equal to 10 Mbps and a carrier frequency of 75 MHz. Determine the minimum double sided Nyquist bandwidth. (4)

Or

- (b) (i) Explain the working of BPSK transmitter and receiver with necessary block diagram. (12)
- (ii) Determine
- (1) Peak frequency deviation
- (2) Minimum bandwidth for a binary FSK signal with mark frequency of 45 KHz, a space frequency of 49 KHz and an input bit rate of 3Kbps. (4)
13. (a) Define pulse modulation and explain about PCM circuit in detail. (16)

Or

- (b) (i) Write a short notes on pulse transmission and intersymbol interference. (6)
- (ii) Describe the adaptive delta modulation system with necessary diagram. (10)

14. (a) Brief the concept behind Frequency Hopping Spread Spectrum. Also explain it's with a suitable example. (16)

Or

- (b) Derive the equation for processing gain and probability of error for a Direct Sequence Spread Spectrum. (16)
15. (a) Draw the satellite communication link model and discuss the link budget.

Or

- (b) Discuss on various losses associated in optical communication link.
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